BEFORE THE PUBLIC SERVICE COMMISSION
OF THE STATE OF DELAWARE

IN THE MATTER OF INTEGRATED RESOURCE	**)**
PLANNING FOR THE PROVISION OF STANDARD	**)**
OFFER SERVICE BY DP&L POWER &	**)**
LIGHT COMPANY UNDER 26 *DEL. C.* §1007(c) &	**)**
(d): REVIEW OF INITIAL RESOURCE PLAN	**) PSC DOCKET NO. 07-20**
SUBMITTED DECEMBER 1, 2006	**)**
(OPENED JANUARY 23, 2007)	**)**

Harris B. McDowell, III, Chair
John Byrne, Co-chair
On behalf of the
Sustainable Energy Utility Task Force
Created by the Delaware General Assembly

Contact information for Senator McDowell:
(302) 577-8744 – Telephone (Wilmington Office)
(302) 744-4147 (Dover Office)
Harris.McDowell@state.de.us

May 3, 2007

ADDITIONAL COMMENTS FILED ON BEHALF OF THE SUSTAINABLE ENERGY UTILITY TASK FORCE

Dear Chairwoman McRae and Commissioners:

I. PSC STAFF GENERATION BID REPORT IGNORES RFP PROCESS

In preparing the Additional Comments of the Task Force on the Interim Report of the independent consultant (hereinafter IC) hired by the PSC, we found that the PSC Staff Generation Bid Report has been posted. It makes recommendations to the Commission BEFORE it has seen or read public comments. We cannot imagine a more cavalier disregard of the principle of public comment. Obviously, the Staff regards public comment as irrelevant to their report.

The RFP process arose from a justifiable concern that electric rates for Delmarva SOS customers increased by 59% after 7 years of price caps. The criteria agreed upon to guide the RFP process included: price stability, reliability of supply, environmental impact and SOS cost implications. The hybrid model recommended by Staff fails to meet any of these criteria.

- Price Stability: As national studies have repeatedly reported (see below for a summary of several), the best method of obviating fuel price volatility is to promote energy efficiency. Instead of employing the best method, the Staff hybrid recommendation worsens the situation. Specifically, the price volatility of natural gas is now included at the scale of the original Conectiv gas plant bid. Directly put, the hybrid model brings to Delmarva SOS customers the volatility associated with increased reliance on gas.

- Reliability of Supply: The Staff recommendation must be understood in a special light regarding reliability of supply. Having accepted Bluewater Wind's request to redact the PJM study on wires impacts in the southern part of our State in the event that the bid plant(s) were built, the Staff then contracted with PowerWorld to evaluate the problem. It did not inform the public of this study. It did not ask for public input on the scenarios that should be researched. It simply released the study publicly on April 30, one day before comments were to be submitted. In the study, the consultant concludes that among the 4 alternatives it reviewed, two had the least contingency/critical violations – the NRG proposal and the Conectiv gas plant proposal (to be built in the northern part of the State). It then reported on a fourth alternative: to build both a windmill plant offshore and a natural gas plant in the <u>southern</u> part of our State. No such alternative had been bid. No such alternative had been evaluated by the IC. Yet, the Staff clearly had an interest in the alternative. But it is very important to understand what this alternative entails. The natural gas plant evaluated by PowerWorld is to provide *voltage support* for an offshore windmill pant (see p. 38 of the PowerWorld report). The Staff hybrid recommendation explicitly recognizes this when it calls for a synchronous condenser CCGT. So configured, the natural gas plant is to provide voltage support, not material electricity. Stating that the plant offers supply to meet peak energy demand is simply wrong unless the Staff have in mind a configuration which would allow both functions to be served. If so, this should have been specified and it should be stated that this will increase the cost of the recommended natural gas plant. But the odd thing is its implications for reliability of supply: the PowerWorld report shows that several contingency violations occur with the effort to move the electricity generated by the proposed offshore windmill plant. Thus, the Staff should have noted the reliability problem its consultant reports. It should then have reported its solution is to utilize a natural gas facility to obviate the problem. It should also explain whether there is a problem of gas supply to the location it recommends. Finally, it should then call for an analysis of the cost of this hybrid in light of these issues and have it compared to the received bids. IT did NONE of these things! Thus, the recommendation, on its face, may solve nothing in terms of reliability of supply, and may create new problems (without analysis, we cannot know one way or the other).

- Environmental Impact: Curiously, the Staff recommendation touts the hybrid as 'clean energy.' Yet, it now includes all of the pollution in the original Conectiv gas bid. No longer 'clean energy,' the option now <u>increases</u> CO_2 emissions in the future.

- SOS Cost Impact: Finally, the Staff hybrid recommendation, at minimum, forces SOS ratepayers to surrender $1.1 billion (levelized 2005$) over market to gain new electricity supply that customers may not need (due to the lack of an IRP showing if *any* supply additions are required to meet future load).

In sum, the Staff-advocated hybrid potentially expands price volatility, does nothing (or worse) for reliability of supply, increases CO_2 pollution, AND costs an enormous amount of ratepayer money. **If it was set on having ratepayers shoulder these risks, it could have simply ordered negotiations with Conectiv for the original natural gas plant and saved ratepayers $1.0 billion while also providing them with 2-3 times the capacity value of the hybrid.**

The above critique should <u>not</u> be construed as endorsement by the Task Force for the natural gas plant proposed by Conectiv. Indeed, the Task Force does not endorse any new power plant. Our analysis above highlights the multitude of problems that would occur if the Commission and Agencies follow the Staff's recommended approach, which is neither consistent nor comprehensive.

Staff's recommendations ignore the original RFP process initiated by the Legislature and instead propose a completely separate "solution" with absolutely no independent analysis of the costs and benefits. This reinforces our position that a proper IRP process has NOT been followed. We respectfully point out the following summary points about Staff's recommendations:

1. No analysis was presented that justified the size of the wind generation project.
2. No costs for transmission interconnection were presented.
3. The report acknowledges that the location of a wind project of any substantial size offshore actually aggravates transmission problems on the Delmarva Peninsula in the absence of further upgrades.
4. The proposed solution to the interconnection problems is an ADDITIONAL natural gas fueled project, a synchronous condenser, whose sole purpose is to provide voltage

support to stabilize the grid in southern Delaware due to the impacts of the proposed wind project.

5. The original RFP did not ask for a unit that would be required to provide voltage support in Sussex County and it is unknown how a contract for such a unit would be priced. Therefore the economics of the project are unknown.
6. In spite of the lack of cost information, we do know that the added costs of a synchronous condenser were not included in the original evaluation of Blue Water's proposal, and can only increase the cost of wind generation relative to Blue Water's original proposal.
7. There was no assessment of the capacity of the gas supply infrastructure, or the costs to expand it in the area of Nelson Substation.
8. There was no consideration given to the ability to obtain licensing at the Nelson site.
9. There was no evidence presented that either of the generation project developers would be willing to consider throwing out their original proposals, and if so, at what cost.
10. There was no discussion of how it would be determined if the proposed recommendation even represents the best alternative.

In short, the Staff's recommendation does not even meet the most basic standards for determining economic and technical prudence. We do not even know the cost of this recommendation to Delmarva's SOS customers. Clearly, if this recommendation had been presented to the PSC by the utility prior to deregulation, it would have been rejected immediately for lack of adequate support. By ignoring the competitive bidding process, the Staff has put itself into the position of designing and picking a "winner" without any systematic analysis. We can only conclude that the Staff's rush to make a recommendation using such rudimentary analysis is an effort to salvage what has been a deeply flawed process from the very beginning. We urge the Commission to reject the Staff's conclusions and to suspend any further consideration of generation options until the IRP process can be conducted properly.

II. PSC and Agencies Must Suspend the RFP Process

The Sustainable Energy Utility Task Force maintains, as it has from the outset, that the RFP process must be suspended until an adequate IRP has been conducted. The Task Force's Final Report[1] and comments in this filing show with greater documentation than either Delmarva's IRP, Independent Consultant's Interim Report, and the PSC Staff Generation Bid Report, that there is no demonstrated need for 600 MW of new supply procured via long-term contracts.

Given the ineffectiveness and lack of transparency of the IRP and RFP process, the inadequacy of Delmarva's IRP and the Independent Consultant's Interim IRP Report, and the existence of meaningful cost-effective solutions to Delaware's ongoing energy and environmental crisis, the Commission must uphold its responsibility to ratepayers by methodically evaluating all cost-effective demand and supply options before selecting any proposal for new supply. We further recommend that the Commission adopt a utility loading order so that demand-side resources are dispatched first to meet new demand, followed by cost-effective renewables and distributed generation, and lastly by conventional fossil or nuclear resources.

[1] Available at http://www.seu-de.org/docs/final_report_4-21.pdf

We would like to note one finding in the Task Force's Briefing Book[2] that may help the public and the Commission put the RFP bids in their proper perspective and realize the monumental waste of resources being proposed. Beginning in January of this year, the California Public Utilities Commission launched the California Solar Initiative the most ambitious renewable energy program in the nation's history. By the end of 2016, at a cost of $2.8 billion over the 10 years, the California Solar Initiative will lead to 3,000 MW of new customer-sited solar energy.[3] By contrast, two of the current RFP proposals would have Delawareans pay over $2 billion for only 600 MW of nameplate capacity. Unlike utility-scale energy of any kind, customer-sited renewables have the effect of both reducing a customer's electricity bills and reducing total system-wide demand, thus saving people money, reducing CO_2 emissions, and reducing retail energy prices. Unlike utility-scale investments, energy efficiency and customer-sited renewables empower individuals to participate in energy decisions and markets rather than force them in to a passive role of risk-taking and bill-paying. If the Commission is seeking ways to spend responsibly some $2 billion of ratepayer money, surely it can find more attractive solutions than those proposed in the RFP docket.

The Task Force has proposed one such alternative, a Sustainable Energy Utility, which is now under consideration by the General Assembly. The Task Force's own detailed demand-side resource evaluations show Delaware's potential to achieve over 400 MW of peak demand reduction by 2015, add over 100MW of customer-sited solar and a further 200MW of customer-sited renewables by 2019, and leverage private capital markets for financing rather than Delawareans' coffers.

We offer these goals to indicate what benchmarks the Task Force believes Delaware should strive to achieve based on its own evaluation of Delaware's DSM potential. We feel certain that if the Commission were to implement a thorough and transparent IRP process and if the Commission had systematically evaluated demand and supply side options for Delmarva SOS customers, the process would identify similarly ambitious and cost-effective strategies to save ratepayers money, to stabilize prices, and to protect our environment.

An IRP is intended to be an objective, analytical exercise to arrive at an optimal resource mix. It is unfortunate that the bounds of the RFP and the IRP dockets have become so blurred. The Commission's call for comments on the Integrated Resource Plan and the Independent Consultant's report has become a platform for parties to lobby for particular proposals rather than to rigorously assess Delaware's need for new supply and to critique the adequacy of Delmarva's IRP and the Consultant's report. As we note below there are several critical inadequacies in both of these reports and in the manner in which the IRP process has been organized and implemented.

III. SEU Task Force Evaluation of Docket Nos. 07-20 and 06-241

A. IRP Process Comments

[2] Available at http://www.seu-de.org/docs/App_A.pdf.
[3] See: http://www.cpuc.ca.gov/Static/energy/solar/061228_csigoals.htm.

Ineffective Integrated Resource Planning

1. As others have already pointed out, we believe that the entire RFP process has been implemented in a way that is contradictory to the true intent of integrated resource planning. IRP is intended to arrive at an optimal "least cost" mix of supply- and demand-side resources. This requires an analysis that systematically begins with load forecasts, and then examines the resources needed to address possible load growth. The current process involves the premature assessment of specific generation proposals before any agreement can be reached on the actual need for generating capacity. In this context, we believe that the consultant's report and conclusions are out of place because of the arbitrary sizes of the generation proposals.

2. We believe that the correct way to go forward is to suspend the current bid evaluation and shelve any plans for re-bidding until the IRP process as applied to a de-regulated wholesale market can be clearly defined and a thorough analysis can be done of load forecasts, demand-side potential and economics.

3. We do agree with the consultant's conclusion that resources outside of Delaware should be included in any future bidding.

4. The correct outcome of a systematic IRP process should be a portfolio of resources and options to address potential load growth, environmental and economic issues. We also urge consideration of a new dispatch regime so that demand-side resources are dispatched first, followed by cost-effective renewables and distributed generation, and lastly by conventional fossil and nuclear resources, as is currently done in California.

Lack of Transparency

1. We are concerned that the consultant's report does not address the transparency of information. In a properly conducted IRP process, cost and technical assumptions should be available for independent analysis. This is not possible when the IRP process follows an RFP process for generation in which most of the important cost and technical information is redacted. It is particularly true in this case since the proposed projects will result in power purchase agreements with potentially large transmission interconnection costs. Based on the bid evaluations, a preliminary analysis was performed to determine the relative differences in transmission costs for the proposed projects. These costs were represented as levelized $/MWh. However, we believe that a full analysis of transmission interconnection for each project should be performed by PJM to accurately predict the costs of any additional transmission infrastructure required to accommodate new generation. Interconnection costs are especially important for the proposed Blue Water Wind project. Based on information from the Long Island Power Authority for a similar offshore wind project, the interconnection costs for 100 MW of wind generating capacity approximately 3 miles offshore ranges from $41 to $52 million in 2002 dollars, or $96,000 – $143,000 per MW-mile. [4]

---

[4] Long Island Power Authority. "Wind Turbine Interconnection Study," Prepared by KeySpan Engineering Services, January 2003, pp. 11-14.

If this is simply scaled up to 600 MW and extended to 13 miles offshore (based on Bluewater's proposal) the costs of transmission for this project could be $749 million to $1.12 billion or higher just for marine cabling and a tie-in to a shore substation. This added cost does not reflect likely transmission upgrades necessary to allow an additional 600 MW of peak output to be carried in the most constrained transmission corridor in PJM territory. Given the possible magnitude of interconnection costs and since Bluewater's redacted proposal excludes PJM's interconnection report, we believe that a detailed, independent analysis of transmission interconnection is vitally important.

How can the public possibly voice an opinion of a proposal when neither private individuals nor elected representatives have the ability to know the true capital cost of a proposed power plant? Would the Commission and other HB6 parties unjustly burden Delawareans with hidden multi-million or billion dollar costs from this or other HB6 proposals without any advance warning and without any means of recourse?

B. Detailed Report Comments

Inadequate and Inaccurate Demand Forecasts

1. The consultant's report starts by posing a series of questions that are then answered in the subsequent sections. The very first question is: "Is the level of DSM proposed by Delmarva reasonable?" The report concludes that it is reasonable, but that it is unimportant.[5]

   We reject this conclusion for several reasons. First, the consultant has not performed a detailed analysis on which to base this conclusion. At this point in time, only the Sustainable Energy Utility Task Force has systematically analyzed DSM potential in Delaware. Based on this analysis, it is clear that there are very large opportunities for demand-side savings in Delaware. For example, the SEU's econometric model indicates clearly that Delaware's residential electricity consumption is approximately twice that of states with robust energy efficiency programs (see section *IV* below).

   Second, the consultant's report uses the wrong peak load forecast. In its IRP, Delmarva Power correctly compares the level of peak load reduction to the load forecast for Standard Offer Service (SOS) customers. This is important because Delmarva's IRP and the on-going RFP process are intended to address SOS customers. Non-SOS customers procure their energy from other suppliers and are therefore outside of the process. Delmarva's peak load forecast for SOS customers starts at 922 MW in 2006 and increases to 1,124 MW in 2016. The consultant's report uses a different forecast which includes non-SOS customers, and totals over 2,300 MW by 2016.[6] This very large discrepancy makes it appear that the need for capacity to serve SOS customers is much larger than it should be.

   If the IC had used the correct SOS load forecast, as DP&L did in its initial IRP filing, the IC would have logically concluded, like the Task Force, that Delaware's energy

---

[5] Independent Consultant "Interim Report On Delmarva Power IRP In Relation To RFP," p. 16.
[6] Independent Consultant "Interim Report On Delmarva Power IRP In Relation To RFP," p. 14.

efficiency and conservation resources have a material effect on the evaluation of the RFP proposals. Furthermore, the IC finds that Delmarva has 543 MW[7] of cost-effective peak demand reduction potential during the next 25 years over the length of the RFP proposals. It seems illogical, at best, to conclude that these DSM resources are immaterial in light of PJM's rating of Bluewater Wind's bid of 600 MW nameplate capacity as equivalent to 120 MW.[8]

2. We believe that the consultant's report inappropriately limits its analysis to only the peak load impacts of DSM. The report also states that DSM will not greatly affect price stability, and then uses this to justify the need for re-bidding supply contracts. Only levelized costs are used to represent the economic impacts of DSM, which the consultant states are insignificant. This logic does not address the economic effects that DSM, especially demand response programs, can have on marginal prices at the time of peak loads. This is critically important when discussing the effects of DSM on price stability at the margin. In a functioning marketplace, energy efficiency and demand response represent the demand elasticity necessary to dampen price instability. Finally, from a customer's perspective, energy efficiency is one of the most powerful hedges against price instability because it directly reduces bills. See the detailed discussion of DSM's price stability and price reduction benefits below (section *V*).

3. We believe that the down-side risks of long-term contracts are not adequately addressed. To date, these contracts have been presented mainly as a hedge against price instability. This might have been true if a broader range of bids had been solicited and evaluated in the context of a proper IRP process. We believe that a good IRP process should include an analysis of at least the following long-term contract risks:

    a. Using long-term contracts as a hedge against price instability only transfers the risk of price instability to Delmarva's SOS customers through a risk premium built into the pricing structure that is roughly proportional to the cost and scale of the generation project. Lacking a thorough analysis, it is highly likely that an oversized project will be selected with a correspondingly high risk premium, even if re-bidding goes forward.

    b. The "winner takes all" contract is itself a large risk. This approach removes the diversity, flexibility, and negotiating leverage which are the hallmarks of good contract risk management. The risk of problems with a single supplier, especially in the absence of a robust demand-side program, is very high. This strategy will only lock in stable, but well above market prices from one of a very small sample of potential generation offers. This strategy also multiplies the technology risks inherent in two of the three proposals. It is simply imprudent to make a commitment to a single large supplier or project.

---

[7] Ibid, page 14.
[8] See p. 67 of the State Agencies' Consultant Report, available at: http://depsc.delaware.gov/electric/irp/state022107bideval.pdf

c. The consultant's IRP analysis does not acknowledge that there are at least two plausible scenarios that could negate the hedge value of a long-term contract. First, market prices could actually go down under a variety of circumstances. Technology improvements, particularly in renewable energy technologies, are very likely to reduce costs for procurement of most renewable resources. Changes in other supply and demand technologies or changes in public policy could also drastically alter the original assumptions built into a long-term contract. These risks are not considered at all. Second, SOS customers are likely to leave Delmarva at a higher rate if prices go up due to a long-term contract. It is highly unlikely that the smaller group of remaining customers will tolerate shouldering the entire fixed cost burden of a long-term contract. This situation can only lead to contract disputes, renegotiations and perversely, less certainty about electricity prices.

4. The history of above-market, long-term contracts in the utility industry indicates that it is likely to cause substantial financial instability for the electric utility. One need only examine the causes of Niagara Mohawk Power Corporation's near bankruptcy in the mid-1990s due to above market supply contracts. It is important to note that only energy efficiency offers the possibility of a hedge against higher prices without the need for a long-term contract or risk premium.

IV. Clarification of the SEU Task Force's Proposals in Response to Professor Firestone's Preliminary Comments

We regret that Professor Firestone has misunderstood and misinterpreted the work of the Sustainable Energy Utility Task Force, all of which is publicly available and amply documented.[9]

Our clarifications of the Sustainable Energy Utility proposal, which is now before the General Assembly, serve to right the public record and also to highlight Delmarva's and the State Agencies' consultant's inadequate evaluation of demand-side resources to meet Delmarva's forecasted SOS-customer demand. As we have already mentioned, Delmarva has underestimated the cost-effective potential for DSM, and the State Agencies' consultant report and Professor Firestone's remarks refer to inaccurate load projections that fail to consider Delmarva's responsibility only to procure energy for RSCI SOS customers, whose numbers continue to decrease (Delmarva reports that its commercial load migration was 681 MW between December 2005 and February 2007).[10]

We agree with Professor Firestone that the SEU's goals are ambitious. The State Agencies' consultant report and the independently evaluated performance of states like California, Connecticut, New Jersey, New York, Massachusetts, and Vermont show that these goals are achievable at costs of 3-5 cents per kWh saved, far less than the cost to procure supply from the RFP bids, which range from 8.7 cents for natural gas generation, to10 cents for offshore wind

[9] See the Task Force website, www.seu-de.org, which is frequently updated.

[10] Delmarva "Response to Comments on Delmarva's Integrated Resources Plan," Filed March 23, 2007, footnote 10 on p. 8. Available at: http://depsc.delaware.gov/electric/dplirp/dplcomm0323.pdf

and 10.7 to 10.8 cents for the coal plant proposals. More importantly, the cost of saved kWhs saved is far below the retail price of 12-15 cents per kWh consumed, the proper benchmark for defining consumer savings as a result of SEU services. Since the State Agencies' consultant reports that all bids in the RFP are *above market*, the SEU's economic benefits can only be conservatively estimated by using today's retail prices (which would increase if any of the RFP options were chosen).

The Task Force's projections assume 33% of Delaware households will reduce their electricity bills by approximately 30% by 2015. These projected savings apply to electricity use; we expect residential and business users of electricity, both within and beyond Delmarva's SOS customer class, to experience savings of this magnitude. We also expect users of energy services other than electricity to experience comparable savings. It is not clear if Professor Firestone understands this. In any case, ALL energy users of ALL fuels are targeted by the SEU.

Regarding the 33% estimated participation rate, a review of the experience of the six states[11] indicates this is achievable *before* the eight years assumed by models built for the Task Force. The conservative approach taken by the Task Force in matters such as participation reflects its philosophy of evaluating the SEU model on solid analytical ground. This same philosophy led us to assume very modest participation rates in the early years of the SEU's development. When Professor Firestone expresses skepticism of the SEU being able to launch savings in 2008, he apparently failed to read the Task Force's material sufficiently. If he had, he would have learned the SEU forecasts a first-year participation of 3% of all Delaware households – a modest target by any gauge. Perhaps he worries the year is too early for the SEU to exist. If so, we should note that SB 18, creating the SEU, was voted out of the Senate Energy and Transit Committee meeting on May 2.

The broader error made by Professor Firestone is that he fails to understand the SEU is a *competitively bid non-profit corporation* in the style of *Efficiency Vermont*, which has operated since 2000 in several of the markets for which the SEU is designed.[12] The SEU Contract Administrator will be hired by the Delaware Energy Office with performance incentives. The Contract Administrator will be rewarded for exceeding performance targets, and will pay a penalty for under-performing. Unlike the RFP bids, the risk of meeting targets is borne by a private nonprofit corporation and the contract implementers it hires to deliver services, not by Delaware households or businesses. Thus, Professor Firestone is flat wrong when he says that "2/3 of Delaware residents will pay more than they do presently." This could only occur if all ratepayers pay for the services of the participants, which they do not; or, if in the face of its success, a regulation were passed requiring electric rates to climb to pay for unneeded power purchased, for example, through long-term contracts. It would be a pity of such a regulation was adopted. We do not believe that the citizens and businesses of the State would tolerate such a thing. We hope Professor Firestone would not advocate a policy of this kind.

The Task Force is proud to note that the SEU will accomplish its ambitious goals for Delaware with n*o ratepayer bill impacts* beyond an 18 cent increase in average monthly bills (due to the increase in the Green Energy Fund – see below for details). Unlike the RFP proposals, working

---

[11] See the Task Force's Briefing Book at: http://www.seu-de.org/docs/SEU_Full_Report.pdf, especially, Appendix A.

[12] We were pleased to receive the endorsement of *Efficiency Vermont*. See: http://www.seu-de.org/docs/supporting_letter_VEIC.pdf

capital for the SEU will be provided by special purpose, tax-exempt bonds in an amount not to exceed $30 million during the initial years of its operation. The bonds will *not* add to the State's General Obligation Bonding.[13] A Vice President of Citigroup's Municipal Securities Division spoke at the March 28th Task Force meeting to express Citigroup's belief that the proposed SEU bond would be attractive to the bond market and that the SEU is financeable at investment-grade yields.[14] The Task Force encourages RFP bidders, as well, to seek financing from private capital markets rather than burden Delawareans with the responsibility of underwriting a corporation's financial liability.

In sum, Professor Firestone shows a fundamental misunderstanding of the Task Force's proposal when he asserts that "while all Delaware residents (and hence all Delmarva customers) will pay for the SEU, its benefits will not be shared by the majority…thus 2/3 of Delaware residents will pay more than they do presently, while 1/3 will pay less, and so it is not clear who the beneficiaries will be." The economic beneficiaries are clear: all Delawareans, who profit from the significant peak load reductions – over 400 MW – the SEU will achieve; and all participants who, through shared savings, finance their investments in energy efficiency, conservation and renewables. Repeating, *non-participants lose nothing* and gain (in economic and environmental terms) by the improved efficiency of the energy system. There are no plans to charge non-participants for these benefits.

The Task Force wishes to clarify that the SEU is a competitive market solution equally available to all Delawareans, not solely Delmarva customers. It is financed by an activity bond without effect on the good faith and credit of the State since it has no tax or ratepayer guarantee underwriting it. The SEU's services do not rely on any single ratepayer class, or indeed any ratepayers at all, to fund the capital outlays for its services; it relies on private capital markets and shared savings.

The average 18-cent increase in monthly residential electricity bills proposed by the Task Force will add to existing Green Energy Funds that help Delawareans install renewable generation on their homes and businesses. The Task Force notes that Delaware has the 2nd lowest mill rate for Green Fund support in the nation (among states assessing such a charge)[15] and believes it can do better. Regardless, the SEU's funding is based on an activity bond purchased by private investors in the private market without effect on ratepayers or taxpayers. To reiterate, the Task Force encourages all who might wish to serve our State's energy needs to follow the path of the SEU and seek funding from the capital market without demanding a 25-year lock-in of revenues from ratepayers who are thereby denied the ability to choose their energy future.

---

[13] The SEU Task Force modeled its Sustainable Energy Bond on the actions of the City of Can Francisco and proposed legislation by the State of Hawaii. On November 6, 2001, San Francisco approved a landmark $100 million Solar Bond that provides funds for investment in end-use energy efficiency and customer-sited and public facilities-sited solar electric and other renewable energy systems. The measure pays for itself entirely from energy savings at no cost to taxpayers. After investigating the action of the City of San Francisco and a recently submitted bill in the Hawaii Legislature to authorize a special purpose, tax-exempt bond series for investments in sustainable energy facilities, the Task Force requested CEEP to analyze the feasibility of utilizing bonds floated in a competitive market for capitalizing the SEU. A summary of the resulting analysis can be found at: http://www.seu-de.org/docs/SEU_Finance_Presentation_Byrne_03-06.pdf

[14] See the minutes of the March 28, 2007 meeting of the Task Force at: http://www.seu-de.org/docs/minutes_3-28.pdf

[15] See Section D, p. 18 of the Task Force's Briefing Book at: http://www.seu-de.org/docs/SEU_Full_Report.pdf

As we explain below, all Delawareans actually benefit from the SEU regardless of whether they participate in its programs. The SEU works to reduce unnecessary energy consumption and to install over 300 MW of new customer-sited renewables. These measures have the effect of reducing peak demand, which actually reduces system-wide energy prices determined largely by expensive peaking units. New utility-scale generation can never achieve equivalent price stability benefits. The price stability benefit offered by utility-scale generation is mainly *contract price stability*, whereas measures that reduce peak loads provide *consumer price benefits*.

Unless paired with coincident decommissioning of existing fossil fuel generation, new utility-scale renewables also do not lead to CO_2 emissions reductions. However, the Task Force recognizes the vital importance of developing utility-scale renewables, which is why it has proposed to double Delaware's Renewable Portfolio Standard (SB 19). An upgraded portfolio standard (RPS) would encourage new renewables to comprise 20% (or 2.5 million MWh per year) of Delaware's energy resource mix by 2019. To put this amount in perspective, a 600 MW wind farm operating at 20% capacity factor[16] will generate 1.0 million MWh per year. The Task Force believes that Delaware's Renewable Portfolio Standard is the policy of preference to encourage the development of new utility-scale investment in renewable generation, as well as investment in distributed renewables.

The Sustainable Energy Bond series will create the means to invest in sustainable energy technologies and measures on behalf of Delaware's residences and small-to-medium-scale businesses. The SEU will provide investments to voluntary participants. There are no mandates to join the SEU; people and businesses *choose* whether and to what extent they will become involved. For those who choose to join, the SEU will invest in their energy needs at a rate equal to the *full incremental cost* of purchasing cost-effective high-efficiency and customer-sited renewables options[17] compared to current market prices. In this way, SEU participants will find no economic difference between the purchase of energy efficiency, energy conservation and distributed renewable energy and conventionally available energy services and equipment.

SEU participants can accrue $1,000 in annual energy savings if they take full advantage of SEU services by 2015. These services include not only electricity, but also heating fuels, green buildings, weatherization, and transportation. In return for the SEU paying the full incremental cost of sustainable energy measures, SEU participants will share one-third of their monthly savings with the SEU over the first five years of the energy-saving measures. After these five years, during which the nonprofit SEU's capital investment is repaid, the SEU participant receives the full 100% savings of their energy efficiency measure or their customer-sited renewable energy. Since SEU services do not require an additional capital expense for

[16] This is the capacity factor specified by the PJM for new wind generation until three years of metered output are completed. See p. 67 of the State Agencies' consultant report, available at: http://depsc.delaware.gov/electric/irp/state022107bideval.pdf

[17] Customer-sited renewables are frequently termed "distributed energy resources." The Task Force uses the two terms interchangeably, with the notation that the SEU will be chartered to serve all energy users and lower dependence on all conventional fuels. For a detailed discussion of customer-sited or distributed renewables, see: http://ceep.udel.edu/publications/energysustainability/2005_es_policy_options_distributed%20resources%5B1%5D.pdf

participants between standard and high-efficiency measures, SEU services are equally available to Delawareans regardless of discretionary income.

The Task Force shares Professor Firestsone's hope that more than one-third of Delaware households can participate in the SEU and protect themselves from the "vagaries of the volatile and unpredictable energy markets." We believe our 33% participation rates by 2015 are conservative. We hope, and expect, that more Delawareans will participate in "this most ambitious and novel plan." If they do, we feel certain that the General Assembly will allow the SEU to return to the private bond market to raise more capital so it can expand its service coverage.

We challenge all parties to propose even more equitable, ambitious, and achievable targets than the Task Force's recommendations. We hope such a spirit will help Delaware wean itself more quickly from volatile and unsustainable energy markets and from regulatory command-and-control where consumers are locked into 25-year decisions that can, and too often have, become long-lasting mistakes. We'd like to see the focus on new competitive sustainable energy markets that put money in peoples' pockets, give people a meaningful choice over their energy options, and lead to immediate and lasting pollution reductions.

V. KEY FINDINGS OF THE DELAWARE SUSTAINABLE ENERGY UTILITY TASK FORCE RELEVANT to PSC DOCKET NOS. 06-241 & 07-20

- Energy efficiency, conservation and customer-sited renewables are the *proven best insurance policy against price volatility*. One national study (cited below) estimates a 7% reduction in electricity prices and a reduction of natural gas prices to 1999 levels if currently cost-effective energy efficiency technologies are fully deployed by 2020 (cited below).

- Energy efficiency, conservation and customer-sited renewables lead to peak demand reduction, which:
    - Achieves price stability
    - Actually lowers energy prices
    - Reduces energy bills, with immediate impacts.

  The SEU has estimated a *peak load reduction of more than 400 MW* from its program (see http://depsc.delaware.gov/electric/dplirp/mcdowell2006.pdf at p. 6). This reduction is larger than the amount of energy proposed for sale to Delaware by 20-25 year contracts from 'clean coal' and offshore wind technologies.

- Energy efficiency, conservation and customer-sited renewables create long-term, high-quality jobs. One estimate by a national partnership of labor unions and environmental organizations estimates that Delaware would realize *over 9,000 new permanent jobs from an aggressive policy of energy efficiency promotion* (cited below).

- Energy efficiency and conservation provide the *cheapest and cleanest energy service* we can possibly use even when it is raining and when the wind is not blowing.

- Better than all other options, energy efficiency, conservation and customer-sited renewables *cut* emissions that harm human health because these 3 tools *reduce the use of existing energy facilities*. The cleanest new utility-scale power plant cannot match this benefit; new utility plants can only slow down the rate of release of future, health-harming pollution.

- Well documented policies and programs in six pioneering states investigated by *the Task Force proves that Delaware can reduce the energy intensity of its residential sector by more than 50%, and its commercial sector by 40%* (see below).

- Energy efficiency, conservation and customer-sited renewables lead to *real* and *immediate* CO_2 savings. New utility-scale generation of any kind can only displace *future* CO_2 emissions. Risk management to address regulation of carbon must take into account this difference. The Task Force proposal results in the State's emissions in 2020 returning to year 2003 levels, a *real reduction of 5.5 million metric tons* (see below). We know of no proposal in Delaware that will *cut* emissions to this extent.

- The SEU approach promotes *technology innovation*. In a field where revolutionary change in technology is necessary, the SEU model enables the citizens and businesses of Delaware to take advantage of these opportunities, rather than locking them into 20-25 year contracts for energy from central station technologies that are in decline in the U.S. and abroad (see below).

On March 28, 2007, by unanimous vote of the attending Members of the Sustainable Energy Utility Task Force,[18] the final report for the first phase of the Task Force's work was adopted. Additionally, by unanimous vote of the attending Members, a comprehensive package of legislation was adopted for action in this session of the General Assembly. This legislation is now before the General Assembly. It includes:

SB 18: Sustainable Energy Utility

- Legislation creating the Delaware Sustainable Energy Utility to serve the sustainable energy needs of *all energy consumers using all fuels*. It is not restricted to electricity or other utility markets. The SEU's charter will be based on three major goals:
    - Provide market development for residential and business purchases of high-efficiency alternatives in energy-using equipment to enable 30% savings in household and company energy use, with 33% of Delawareans participating by 2015 – these estimated savings will cut annual household energy costs by $1,000
    - Provide expanded weatherization services to residences, with a focus on the needs of low- and moderate-income families, doubling the number of annually weatherized units by 2015
    - Promote at least 300 MW of customer-sited renewable energy applications.

SB 19: Renewable Portfolio Standard

- Second, upgrade Delaware's Renewable Portfolio Standard to "best practice," using New Jersey as the State's benchmark. This would require an increase in renewable energy purchases by the State's electric utilities from 10% to 20% by 2019. Two percentage points of the new target will be reserved for solar photovoltaics. The Solar Carveout will provide a significant boost to PV technology, with the potential to increase investment in local PV manufacturing capacity.

SB 35: Green Energy Fund

- Third, increase the Green Energy Fund mill rate to $0.000356 per kilowatt-hour. Currently, Delaware has the second lowest wires charge for incentivizing renewable energy, energy efficiency and low-income energy weatherization among the 23 states that have enacted such charges. By increasing the mill rate, the average residential customer would see an increase of 18 cents to the typical monthly electric bill.

SB 8: Net Metering

---

[18] Members are: Senator Harris B. McDowell, III, Chair; Dr. John Byrne, Co-Chair (Director, Center for Energy & Environmental Policy, University of Delaware); Senator Patricia Blevins; Senator Charles Copeland; Senator Gary Simpson; Representative Bethany Hall-Long; Representative Vincent Lofink; Representative Teresa Schooley; Representative Pamela Thornburg; Mr. Arthur Padmore, Public Advocate; Mr. Charlie Smisson, State Energy Coordinator; Mr. Keith Lake, Executive Director, Peoples Settlement Association; Ms. Dominique Baron, Environmental Advocate, Delaware Nature Society; and Mr. Andrew Slater, Delaware State Senate Office. Mr. Ralph Nigro (Vice President, Applied Energy Group, Inc. and Policy Fellow, CEEP, University of Delaware) serves as Task Force Technical Consultant. The following members of CEEP, University of Delaware serve as Research Staff: Mr. Jason Houck, Ms. Rebecca Walker, Mr. Jackson Schreiber, Mr. Lado Kurdgelashvili, Dr. Aiming Zhou, Mr. Huei Wong, Mr. Eric Partyka, and Mr. Ryan Harry.

- Fourth, update Delaware's Net Metering Law to encourage larger scale customer-sited renewable energy applications that contribute to long-term development of sustainable energy supply. Delaware's current policy limits customer-sited installations to 25 kW. In many cases, this limitation makes it unattractive for larger commercial customers to install PV or other customer-sited renewable energy systems.

VI. RELEVANCE OF THE SEU TO DOCKET NOS. 06-241 & 07-20

1. Impacts of Sustainable Energy Development on Consumer Energy Prices

Energy efficiency, conservation and customer-sited renewable energy strategies are well-tested tools to achieve price stability goals. More than that, they have been shown by empirical research to lead to *lower* prices than would have occurred without investment in their services. Each tool is discussed in turn for its effects on conventional energy prices. Because the research literature on the subject is voluminous, it is not possible to summarize all of it here. Instead, representative findings have been selected.

a. Energy Efficiency and Conservation

A recent comprehensive study of the American Council for an Energy-Efficient Economy (ACEEE)[19] reports the following findings:

- "[I]investments in efficiency and conservation will create major economic benefits for Americans by *moderating gas prices* [and] *reducing energy bills*…" (p. 1, emphasis added)

- "Energy efficiency offers many…hedging benefits: by moderating demand growth, history has shown that small decrements in marginal demand can exert significant leverage on prices. In this sense, *energy efficiency may be our nation's best insurance against natural gas price volatility*." (pp. 2-3, emphasis added)

A joint research effort of the Lawrence Berkeley National Laboratory and ACEEE[20] provides empirical estimates of the *price reduction effect* of energy efficiency investments. Comparing U.S. energy demand with and without energy efficiency policies in place, the authors found that natural gas prices were predicted to *decline* in real terms. In the base case, using the U.S. Department of Energy's National Modeling Energy System (NEMS), natural gas prices are projected to increase by 49% by 2020. Under the policy scenario prepared by LBL and ACEE based on well-established energy efficiency programs in the U.S. and their measured performance, electricity prices are projected to drop 7% and natural gas prices are projected to decline to below 1999 levels (e.g., to $1.9 per million Btus in 2020): "a *37% decline* from the base case."(Executive Summary, p. x).

[19] Prindle, William. 2003. *Energy Efficiency Solutions to the Nation's Natural Gas Problems*. Washington, DC: American Council for an Energy-Efficient Economy.
[20] Nadel, Steven and Howard Geller. 2001. *Smart Energy Policies: Saving Money and Reducing Pollutant Emissions through Greater Energy Efficiency*. Washington, DC: American Council for an Energy-Efficient Economy.

Research conducted for the Regulatory Assistance Project on the New England region[21] concluded that investment in energy efficiency and conservation reduces the region's vulnerability to natural gas price spikes. To measure the ability of energy efficiency to provide reliability to energy systems, the author built a 12-month price duration curve for New England. The hours with the top 1% of highest energy prices accounted for 15.8% of the region's wholesale costs. Energy efficiency was then shown to lower peak demand, thereby obviating price spike vulnerability by a two-step process. First, energy efficiency and conservation avoid or significantly reduce use during the highest-priced hours. Second, the resulting lower peak demand reduces wholesale market prices for what are now the top hours. In this way, *demand reduction through energy efficiency and conservation mitigate the risks of high price spikes at peak times* (p. 9).

Research conducted to synthesize the findings of researchers on energy efficiency's 'hedge value'[22] found consistently positive and significant benefits. "Volatility decreases as demand decreases (for a constant supply); EE reduces hedging cost; EE can be more valuable than previously considered and should be given credit for the reduction of hedging cost" (p. 8). The researcher also notes that "Less demand = less volatility = less hedging" (p. 10).

Finally, a 2006 research survey published in the premier international journal *Energy Policy* sums up the findings on the role of energy efficiency and conservation in stabilizing or reducing prices and in aiding price risk management: "efficiency has…*inherent risk management benefits* (e.g. as a form of protection or 'hedge' against price volatility)…rarely acknowledged or otherwise weighted into the investment decision [of the utility]" (p. 191). The "Interim Report on Delmarva Power IRP in relation to RFP" filed by independent consultant on April 4, 2007 in Docket No. 06-241 (i.e., the RFP docket – not the IRP docket) appears to have neglected this empirically established effect.

b. Customer-sited Renewables

When located at the site where conventional energy demand is generated and used to lower this demand, a renewable energy system exhibits the same effects on conventional energy prices as energy efficiency and conservation. In a detailed investigation of the impacts of the then-proposed Renewable Portfolio Standard (RPS) before the Delaware General Assembly in 2005, CEEP reported on extensive research about this matter. An extended quotation from pp. 3-4 of the Briefing Paper is provided below. Cited sources can be found in the original Paper available at
http://ceep.udel.edu/energy/publications/2005_es_Delaware%20Senate_RPS%20briefing%20paper.pdf.

---

[21] Cowart, 2001. *Efficient Reliability: The Critical Role of Demand-Side Resources in Power Systems and Markets*. Montpelier, VT: The Regulatory Assistance Project.

[22] Dickerson, Chris Ann. 2003. *Energy Efficiency Valuation as a Financial Hedge*. Presentation at ACEEE's National Conference on Energy Efficiency as a Resource (June 9-10, 2003). Accessed at http://www.aceee.org/conf/03ee/Dickerson-6w.pdf. Hedge value refers to the ability of an investment to improve asset value by lowering its vulnerability to sudden, large changes in market conditions, including price spikes.

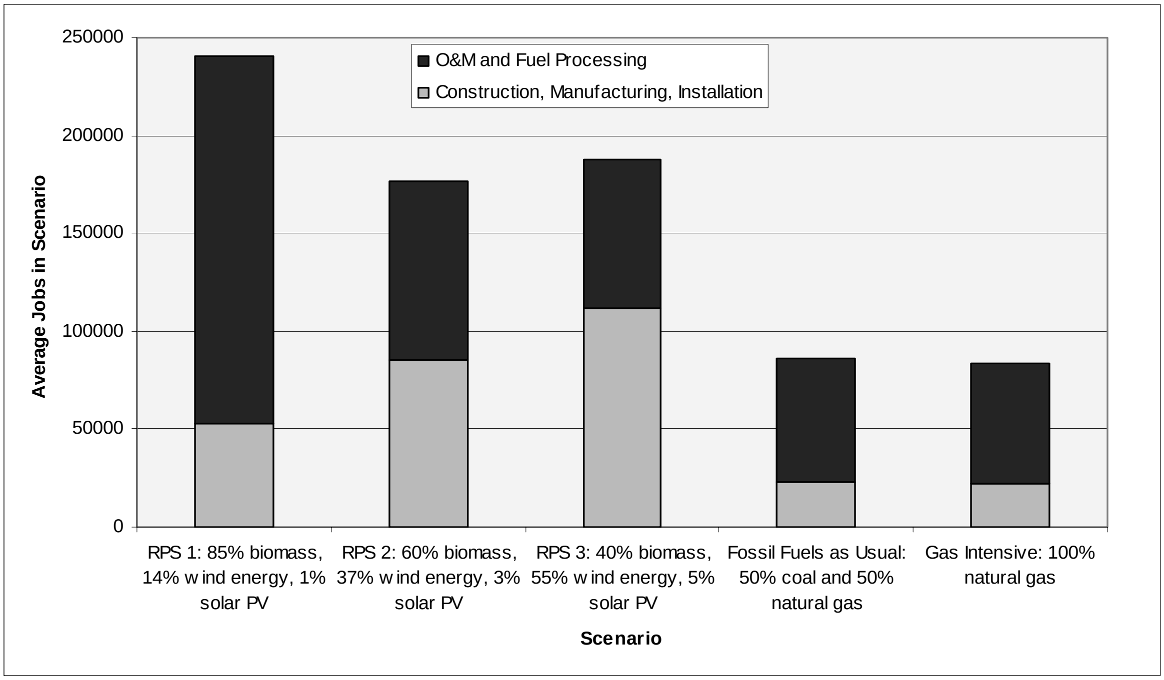
> "During the past 15 years, the majority of new US generating capacity has been fueled by natural gas. Over 95% of the 250 gigawatts of new generation added since 2000, has been natural gas-fired technology (Taub, 2003). At the same time, an increasing number of residences and businesses have opted to use natural gas for space heating. As a result, natural gas, which currently accounts for 25% of US energy use, is projected to expand by 1.5% annually at least through 2025 (US Energy Information Administration [EIA], 2005). As many utilities and retail customers have discovered, however, natural gas is proving to be a more volatile commodity than previously predicted (Henning et al., 2003).
>
> Recent supply shortages of up to 4 billion cubic feet per day have caused sudden price increases for natural gas. During the 1990s, natural gas prices hovered around $2.00 per million British Thermal Units (MMBTU). But over the last three years, natural gas prices have spiked to above $6 per MMBTU and have fluctuated dramatically (EIA, n.d.). While one would expect the market to eventually respond to these high prices, the outlook for increased supply in the near term is not promising: current stocks of natural gas in underground storage are unusually low due to a combination of cold weather, declines in domestic production, and declines in net imports (Cambridge Energy Research Associates, 2004). Moreover, even with increased supplies, the seasonal fluctuation in natural gas prices is likely to remain.
>
> The combination of rising natural gas prices and fuel price volatility has contributed to electricity price increases across the country. Utilities typically seek to hedge their natural gas investments through the use of financial contracts like futures and options. Since renewable energy sources like wind and solar energy rely on fixed-price (i.e., free) fuel, they can serve as a direct hedge against natural gas fuel price volatility. Integrating wind energy and other renewable energy resources into a utility portfolio can provide a more complete physical hedge against natural gas price variation than conventional financial strategies (Bolinger et al., 2004). As a result, energy industry experts have argued that diversifying utility generation portfolios with renewable energy is an important best practice for utility managers to reduce fuel price volatility and stabilize electricity prices (Biewald et al., 2003; Roschelle & Steinhurst, 2004).
>
> In addition to serving as a direct hedge against natural gas price variability, renewable energy development also produces downward pressure on natural gas prices by displacing natural gas generation and decreasing natural gas demand (Elliott et al., 2003). The National Renewable Energy Laboratory recently concluded that this price reduction effect can be significant, with a gas price reduction of up to 2% for each 1% of gas demand displaced (Wiser et al., 2005). As a result, it is possible that the above-market cost of renewable energy can be offset by natural gas price decreases caused by expanded use of these options."

The above-described effects are amplified when renewables are located at the customer's demand site. First, distribution losses are avoided, thereby improving the economic performance of these systems for customers over conventional central station technologies like utility-scale power plants. Like energy efficiency, customer-sited renewables improve end-use efficiency. Second, decreased demand for distribution capacity in peak periods benefits all grid-served customers, providing a 'decongestion' effect on line capacity demand (this is especially true for customer-sited renewables like solar thermal and photovoltaics, which generate most of their energy at demand peaks). Additionally, it lowers wear on distribution lines, thereby reducing the extent of near-term need for expensive distribution upgrades (again, benefiting all users). All of these effects enable Delaware's consumers to spend less on conventional energy services, lower their vulnerability to conventional energy price spikes, and create pressure on the conventional energy system to lower its prices and improve its performance. These benefits cannot be matched by a supply-side focus on central station technologies and investments.

2. Job Creation

The SEU focus on energy efficiency, conservation and customer-sited renewables has important, positive employment implications for the State. The Briefing Paper mentioned above summarizes research on this question. An extended quotation is taken from pages 10-11 of the Briefing Paper, regarding the potential employment impacts of customer-sited renewable energy development.

> "The Renewable and Appropriate Energy Laboratory (RAEL) at the University of California, Berkeley analyzed and compared the results of thirteen different job creation studies in a report entitled, *Putting Renewables to Work: How Many Jobs Can the Clean Energy Industry Generate?* (Kammen et al, 2004). RAEL concluded that renewable installations generate more construction, manufacturing, and installation jobs than do coal and natural gas plants. RAEL also noted that job growth in the traditional fuel and utility industries has declined as a result of mechanization and mergers, while job growth in the renewable energy industries has accelerated as a renewable energy markets have expanded. To better illustrate the comparative job creation effect of renewable energy development, RAEL developed five future energy scenarios [see bar chart below]. The first three scenarios assume a 20% national RPS, while the second two scenarios assume that all future energy needs are met with coal or natural gas. The RPS scenarios create 176,000-241,000 new jobs, while the fossil fuel scenarios create only 86,000 and 84,000, respectively.



Comparison of average employment from five electricity generation scenarios
Source: Kammen et al (2004)

> In creating these scenarios, RAEL used data from a job creation study completed by the Renewable Energy Policy Project (REPP) in 2001…REPP also concluded that investments in renewable energy development have a more significant job creation affect than equivalent investments in fossil fuel generation. [Their estimate is] every million dollars invested in wind energy generates 5.7 person-years [of employment], while every million dollars invested in solar photovoltaic systems creates 5.65 person-years of employment. By comparison, every million dollars invested in coal technology creates …3.96 jobs… A study by the NJPIRG Policy & Law Center found that "tens of thousands of well-paying jobs" would be created if the Mid-Atlantic region developed its renewable resources. If 10% of the homes in the Mid-Atlantic region installed 2 kilowatt solar systems, for example, NJPRIG calculated that 13,790 new jobs would be created (Algoso & Rusch, 2004)."

Even greater job generation potential from energy efficiency has been reported in the research literature. A comprehensive effort to estimate the net employment effects of a shift to a more energy-efficient economy based on current technology was completed in 2003.[23] It concluded that 870,000 net new jobs would be created by 2010 from energy efficiency over a business-as-usual scenario in which energy intensity is held constant. This takes into account any losses in the conventional energy sector. The created jobs vary from positions in manufacturing where the new technologies are produced, to wholesale and retail services where the technologies are sold, and to the trades where the technologies are installed. Using an econometric model to estimate

[23] Geller, Howard. 2003. *Energy Revolution.* Washington, DC: Island Press. Dr. Geller was Executive Director of the American Council for an Energy-Efficient Economy, founding its Washington, DC office in 1981 and serving in that position until 2001.

job generation from energy efficiency, a joint study of the Economic Policy Institute, Tellus Institute and the Center for a Sustainable Economy[24] concludes that a net increase of 1.4 million jobs can be projected through 2020 if currently cost-effective technologies diffuse rapidly into the U.S. economy.

Delaware's share of the new employment has not been studied in depth, but the Apollo Alliance, a partnership of national labor and environmental organizations,[25] has posted a model on its website to estimate each State's potential job gains and losses. The Alliance estimates that over a 10-year period of investment in cost-effective energy efficiency options, Delaware would gain 9,885 permanent new positions, including 1,250 new manufacturing jobs and 1,497 new construction jobs.

3. Economic and Technical Viability of Demand-side Resources

In its April 4, 2007 Interim Report for Docket No. 06-241, the independent consultant questions the ability of Delmarva Power's proposed demand response and energy efficiency programs (identified in its Integrated Resource Plan[26]) to materially affect demand, especially peak demand, in a way that would measurably contribute to price stability or long-term electricity needs. The Task Force is reviewing the independent consultant's Interim Report and has several concerns with its approach on the matter. But regardless of whether the proposed programs of the utility are found to be sufficient or deficient in the context of Docket No. 06-241, the Task Force has provided estimates of the SEU indicating a sizable cost-effective potential to lower peak demand by 400-500 MW through energy efficiency. When the SEU target of 300 MW of customer-sited renewables is additionally considered, the Task Force is confident that State electricity prices and long-term needs can be readily and significantly affected by demand-side programs and policies.

a. Lessons from California

Some skeptics of demand-side policies and programs doubt their effectiveness, especially during periods of unusually high peak demand and/or price spikes. The experience in California in 2000-2001 surely ranks as a clear case of extremely tight electricity supply, highly unusual weather, and previously unexperienced power plant outage and maintenance problems, all leading to exceptional wholesale price behavior and a rash of extraordinary supply emergencies. In the two-year period, the State saw wholesale electricity clearing prices climb above $375 per MWh (December 2000), more than 10 times the average in previous years. The State also suddenly found itself combating threats of blackouts with far greater frequency than had been previously experienced. In 1999, there were 5 Stage 1 alerts (reserves below 7%) and 1 Stage 2

[24] Barrett, James P., Andrew Hoerner, Steve Bernow and Bill Dougherty. 2002. *Clean Energy and Jobs: A Comprehensive Approach to Climate Change and Energy Policy.* Washington, DC: Economic Policy Institute and Center for Sustainable Economy.

[25] Apollo Alliance. 2007. *The Impact of the Proposed Apollo Project on the Economy of Delaware (Average of 10-Year Investment Cycle and Permanent Effects (In Constant 2004 Dollars))—Detailed Sectoral Results.* Available at: http://www.apolloalliance.org/state_and_local/delaware/dejobs.cfm

[26] Delmarva Power filed its IRP on December 1, 2006 and supplemented it on January 8, 2007. Information and documents available at: http://depsc.delaware.gov/dplirp.shtml

alert (reserves below 5%). In 2000, the number of Stage 1 and 2 alerts increased to 55 and 36, respectively, and there was one Stage 3 alert (reserves below 1.5%). In 2001, matters worsened considerably. Stage 1 alerts climbed to more than 60; Stage 2 alerts reached 60; and disturbingly, there were nearly 40 Stage 3 alerts. There are many explanations for the onset of high prices and supply emergencies, not the least of which is market manipulation investigated by the Federal Energy Regulatory Commission.[27]

A less-often investigated question is how California managed to recover from what all agree was an unparalleled crisis in U.S. electricity history. The answer is instructive. With no ability to buy or build new power plant capacity fast enough to stabilize its electricity markets, the State turned to energy efficiency and conservation. Its utilities had reduced their use of these tools in the 1990s, believing that supply-focused strategies would be best for meeting State needs in a fast-changing economy. State programs similarly lost their luster and funding was lowered. Arguably, California's energy efficiency and conservation programs were the best in the country. Nonetheless, they were pushed to the periphery as supply-side thinking grew in importance. But in 2001, the apparatus was quickly returned to service as State policy committed funds and priority to their use. An investigation by the California Energy Commission[28] summarized the results of an initiative begun in September 2000, with the signing of Assembly Bill 970:

> By June 2001, the state actually achieved 5,570 megawatts of demand reduction with an additional 3,200 megawatts of reduction available by voluntary curtailments when necessary. This campaign contributed to a 6.7 percent reduction in overall electricity consumption in the state, and a 10 percent reduction during summer peak hours reaching a record reduction of 14 percent in June 2001. This remarkable accomplishment reflects the most aggressive and comprehensive energy conservation and efficiency effort in the history of our state. (p. 1)

With one of the largest, most complex and still fast-growing economies in the world, the State continues to require the addition of power plant capacity to meet its needs. But the key role of energy efficiency is now established in law. The California Public Utility Commission requires all utilities in the State to follow an energy resource loading order that recognizes "cost effective energy efficiency [as] the resource of first choice for meeting California's energy needs" (p. 2).[29] Second in the loading order for utility dispatch are customer-sited and other renewables. Only after these resources have been fully deployed is conventional generation to be used.

The State recently tested the efficacy and reliability of this loading order when it experienced a heat wave in July 2006 July 2006 with temperatures above 110 °F which had been exceeded in

---

[27] See FERC. 2003. Final Report on Price Manipulation in Western Markets: Fact-Finding Investigation of Potential Manipulation of Electric and Natural Gas Prices. Docket NO. PA02-2-000Available at: http://fl1.findlaw.com/news.findlaw.com/hdocs/docs/ferc/wstmrkt32603rptpt1.pdf

[28] CEC. 2002. *The Summer 2001 Conservation Report*. Available at: http://www.energy.ca.gov/reports/CEC-400-2002-001/CEC-400-2002-001.PDF

[29] CPUC and CEC. 2005. Energy Action Plan II: Implementation Roadmap for Energy Policies. Available at: http://www.energy.ca.gov/energy_action_plan/2005-09-21_EAP2_FINAL.PDF

only "4 of the last 56 years"[30] and characterized by the California Independent Service Operator as a "1-in-50 year heat storm" resulting in demand peaks not projected to be reached until 2011. The State turned again to its energy efficiency programs for relief. In response to a declared Stage 1 Emergency, California's utilities turned to demand response and load shedding programs that realized a 1,217 MW reduction and managed its highest recorded peak demand without service interruption.[31]

As the State plans for summer 2007, the CPUC has ordered Southern California Edison (SCE) to expand its Air Conditioning Cycling Program to target an additional 300 MW of program capacity.

In their recent joint report, the CPUC and CEC observe:[32]

> Cost-effective energy efficiency is the resource of first choice for meeting California's energy needs. Energy efficiency is the least cost, most reliable, and most environmentally-sensitive resource, and minimizes our contribution to climate change…For the past 30 years, while per capita electricity consumption in the US has increased by nearly 50%, California electricity use per capita has been approximately flat. This achievement is the result of continued progress in cost-effective building and appliance standards and ongoing enhancements to efficiency programs implemented by investor-owned utilities, customer-owned utilities, and other entities.

b. Policy Lessons from Six States

In light of California's experience, it is important that Delaware consider carefully the role of sustainable energy policy in shaping its energy future. One method of assessing the available potential for demand-side resources to affect Delaware electricity prices and long-term needs is to compare the performance of the State with other states with well-documented, well-performing energy efficiency programs.

To enable this comparison, CEEP researchers constructed an econometric model to predict State residential electricity intensity as a function of prices, weather conditions, and policy/program infrastructure. State residential electricity consumption and price data for 2001-2005 were gathered from the U.S. Energy Information Administration. State income data were obtained from the U.S. Bureau of Economic Analysis for the same period. Weather data in the form of heating degree days and cooling degree days for each state were taken from the U.S. National Oceanic and Atmospheric Administration's records.[33]

---

[30] CPUC. 2006. *Resource Adequacy Report*, p. 16.

[31] CA ISO. 2006. News Release, August 1.

[32] CPUC and CEC. 2005. *Energy Action Plan II*, p. 3 (see fn. 14)

.

[33] For electricity consumption and price data, see: Energy Information Administration (EIA). 2006. *Electric Power Annual 2005 - State Data Tables.* For income data, see: Bureau of Economic Analysis (BEA). 2007. *Regional Economic Accounts*. For weather data, see: National Oceanic and Atmospheric Administration. 2007. *Historical Climatological Series 5-1* and *Historical Climatological Series 5-2*.

CEEP research staff has extensively documented the energy efficiency programs and policies of California, Connecticut, Massachusetts, New Jersey, New York and Vermont, all of which are acknowledged leaders in the field of sustainable energy.[34] By contrast, Delaware and Pennsylvania have modest programs and policies with only recently supported initiatives. Thus, an analysis of the period of 2001-2005 will capture the effects of energy policies and programs in the six pioneering states and will reflect the comparatively minor policy and program commitments of the latter two states.

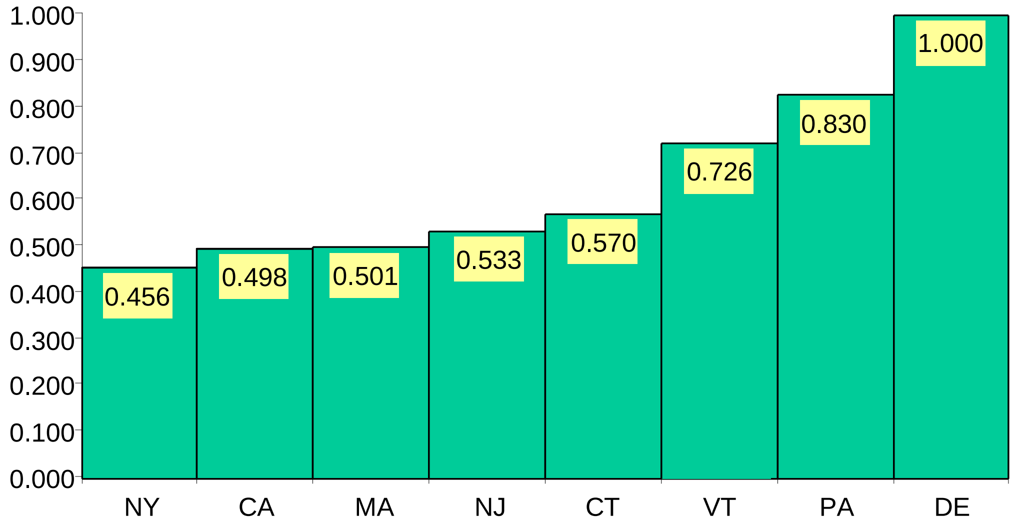
Using a logarithm model of energy intensity predicted by prices, weather and policy/program commitments, the model successfully explains 99.5% of the variance in State electricity intensity data; all estimates of the explanatory variables are robust (with the exception of electricity price – a likely result of the relative short-term price inelasticity in the residential sector); and all carry the expected sign (see table below).

Dependent Variable: ELEC_INT_RES				
Method: Least Squares				
Included observations: 40				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
PRICE_RES	-0.093712	0.080691	-1.161369	0.2546
Degree Days	0.141612	0.052645	2.689960	0.0116
D1 (NY)	3.198638	0.543682	5.883287	0.0000
D2 (CA)	3.286077	0.505603	6.499318	0.0000
D3 (MA)	3.292275	0.537361	6.126751	0.0000
D4 (NJ)	3.354333	0.527645	6.357182	0.0000
D5 (CT)	3.420913	0.534167	6.404198	0.0000
D6 (VT)	3.663360	0.549695	6.664350	0.0000
D7 (PA)	3.797427	0.526068	7.218504	0.0000
D8 (DE)	3.983360	0.515629	7.725250	0.0000
R-squared	0.994868	Mean dependent var	4.503452	
Adjusted R-squared	0.993329	S.D. dependent var	0.288073	
S.E. of regression	0.023529	Durbin-Watson statistic	2.170422	
Sum squared residuals	0.016608			

Converting the logarithm estimates to standard form and indexing the results by setting Delaware's electricity intensity at 1.000, we can numerically compare the effects of policy and program commitments *after* adjusting for price and weather differences among the eight states. The results are sobering: Delaware has the highest residential sector electricity intensity among the eight states. New York, California, Massachusetts and New Jersey households use *one-half or less* of the electricity used by Delaware homes, thanks to comparatively well-funded and extensive energy efficiency and conservation policy regimens. Because their programs were more recently created, Connecticut and Vermont residences use more electricity than those in the

[34] See the Task Force *Briefing Book*, Sections F and H, and Appendix A for details. Available at: http://www.seu-de.org/documents.html

four best-performing states. Still, their homes consume only *55-70%* of the electricity of their Delaware counterparts. Only Pennsylvania is statistically near the rate of energy inefficiency of the Delaware residential electricity sector.



Prepared for the Delaware Sustainable Energy Utility Task Force by the Center for Energy & Environmental Policy.

Comparison of State Residential Sector Electricity Intensities (DE = 1.000)

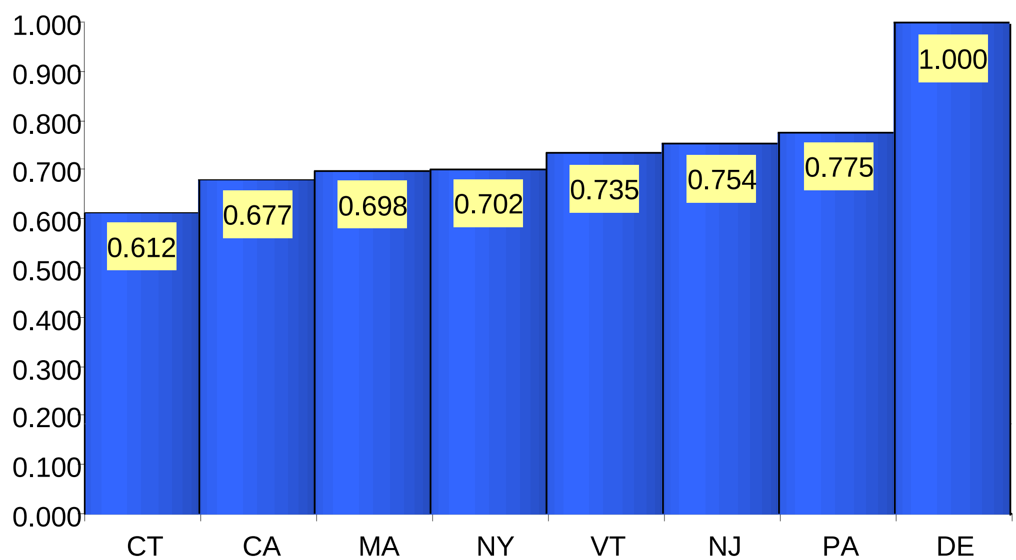
A comparable analysis of the commercial buildings sectors of the eight states finds Delaware again the most energy inefficient. Once more, the model provides a robust estimate of electricity intensity, explaining 95.7% of the variance in the data and providing statistically significant estimates of the policy/program effects by State after price and weather differences are considered. Again, the estimate of price effect is not statistically strong, reflecting the inability of commercial building occupants to quickly alter their electricity use in the face of price changes (often because they are building tenants rather than owners). Weather conditions are found not to have an important role in commercial sector electricity intensity, an expected outcome since the bulk of hotels, office blocs, shopping malls, etc. vary little in their use of lighting or space conditioning throughout the year.

In this sector, Connecticut, California, Massachusetts and New York are leaders in electricity efficiency, using 50-70% of the electricity that Delaware buildings consume to serve customers. Vermont and New Jersey are not far behind, using only 75% of Delaware's consumption and Pennsylvania's commercial buildings use only about 80% as much electricity as those in Delaware. Here, the difference in building code standards, as well as targeted incentives, account for part of the difference in energy efficiency.

Dependent Variable: ELEC_INT_COM
Method: Least Squares
Included observations: 40

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PRICE_COM	-0.038594	0.105777	-0.364863	0.7178
Degree Days	0.069694	0.077562	0.898559	0.3760
D1 (NY)	4.061541	0.791327	5.132569	0.0000
D2 (CA)	4.025604	0.740784	5.434246	0.0000
D3 (MA)	4.055845	0.784244	5.171661	0.0000
D4 (NJ)	4.133190	0.767709	5.383799	0.0000
D5 (CT)	3.924838	0.775451	5.061362	0.0000
D6 (VT)	4.107223	0.799577	5.136747	0.0000
D7 (PA)	4.159587	0.766455	5.427046	0.0000
D8 (DE)	4.415080	0.748656	5.897343	0.0000

R-squared	0.957361	Mean dependent var	4.627125
Adjusted R-squared	0.944570	S.D. dependent var	0.145323
S.E. of regression	0.034214	Durbin-Watson statistic	1.666272
Sum squared residuals	0.035119		



Prepared for the Delaware Sustainable Energy Utility Task Force by the Center for Energy & Environmental Policy.

Comparison of State Commercial Sector Electricity Intensities (DE = 1.000)

Eventually, diminishing returns will militate against further reliance on energy efficiency options to stabilize conventional energy prices. At that point, long-term needs may then require consideration of major additions to central station power plant capacity. But the above estimates of comparative energy inefficiency in Delaware suggest we are far from that day. If California, continues to find gigawatt-scale peak reductions available from cost-effective energy efficiency resources with possibly the country's best developed policy and program framework, it is likely that Delaware has ample, untapped energy efficiency 'reserves' still to utilize.

4. The SEU Invites Green Technology Innovation to Come to Delaware

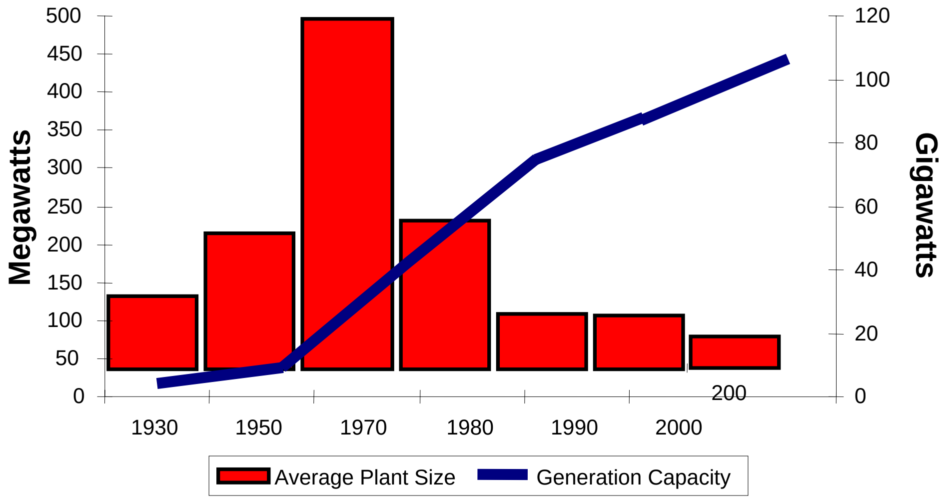
Delaware can create vibrant markets for customer-sited renewable energy with effective policy based on current best practices. The Task Force proposes a renewable portfolio standard (RPS) upgrade that would require electricity providers to procure 20% of their electricity from renewable resources by 2019, with a 2% solar photovoltaics (PV) carve-out. This upgrade would bring Delaware into alignment with New Jersey's nation-leading solar market, which is growing annually at over 50% and has sustained solar renewable energy certificate (REC) prices of over $0.20 per kWh. The New Jersey market is an example of how a state can make optimal use of customer-sited renewables – all of its solar market growth is based on customer-sited applications.

With an SEU-managed Delaware Green Energy Fund and a robust RPS, the SEU can use both incentives and competitive market forces to make customer-sited renewable resources fully competitive with retail electricity.

Several other states are working along similar paths. The Vermont legislature is currently considering legislation that would require 40% of its electricity resources to be produced from local renewable resources by 2018, with customer-sited renewables receiving special priority. Maryland's Governor just signed a bill in April that creates a 2% solar carve-out by 2022. California is working to increase its RPS to 33% by 2020.

By encouraging utilities to meet RPS requirements with customer-sited resources, the Task Force has determined that Delaware can install over 100 MW of customer-sited solar electric systems, plus an additional 200 MW or more of customer-sited geothermal, solar thermal, and wind systems at homes, businesses, and farms. These combined resources would provide Delawareans with at least 300 MW of customer-sited renewable resources by 2019.

The emphasis on distributed renewables is consistent with power plant capacity trends in the U.S. Since the 1970s, unit capacity of generating facilities has declined greatly.



Sources: T. R. Casten (1995) *The Energy Daily* (September 7), Hirsh. 1999: 274; and *EIA Electric Power Annual* (1981, 1990, 2000, 2006)

Trends in U.S. Power Plant Capacity

The strategy put forth by the SEU has a critical advantage over conventional proposals to increase electricity and other energy supplies. Proposals to add new, large-scale electricity and other energy capacity depend for their economics on locking in long-term contracts of 20-25 years to produce the necessary revenues for multi-billion dollar investments. The SEU recognizes the energy sector is undergoing dramatic technology change and avoids this error. Consistent with the trend in the above graph, the SEU focuses on appropriate scale, flexibly expanded technologies whose economics are modular (i.e., earnings are based on adding capacity when and as necessary in increments to meet growth and no more).[35] This approach reinforces the overall conservation philosophy of the SEU – *use only the energy you need, in the cleanest form possible, and without waste or barriers to the adoption of even cleaner, more efficient new technologies*.

5. Carbon Effects of the SEU Program

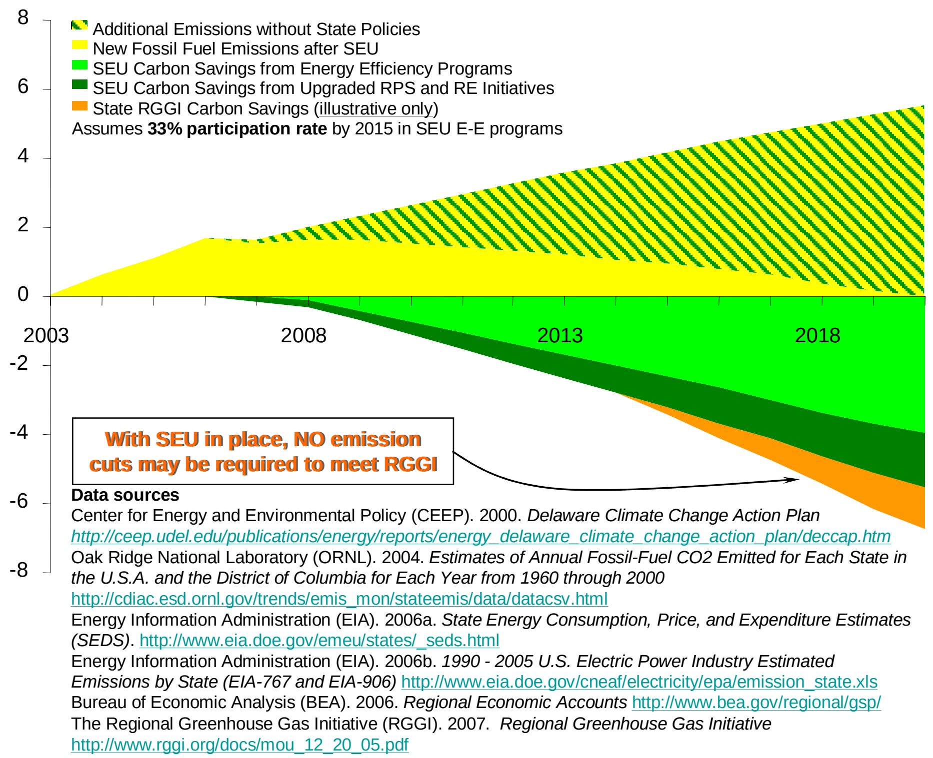
Finally, the Task Force estimates that the State's Carbon Footprint will be reduced dramatically by SEU-sponsored investments in energy efficiency and customer-sited renewables. The SEU will create real, measurable, and verifiable CO_2 savings from its first year of operation. With only one-third of Delaware households and businesses assumed to participate in SEU programs by 2015,[36] the SEU can save Delaware *5.5 million metric tons of CO_2 emissions by 2020*, or 33% of the State's current carbon footprint.

This is the carbon equivalent of taking 650,000 cars off Delaware roads each year. Strategies that build cleaner energy facilities to meet future demand growth can only slow, delay or even flatten

[35] For a detailed discussion of the economics of customer-sited or 'distributed' energy supplies, see: http://ceep.udel.edu/ publications/energysustainability/2005_es_renewables&risk.pdf
[36] The Task Force believes this is a conservative estimate of likely participation after 7 years of programming.

future CO_2 releases. The SEU *cuts* carbon emissions by lowering the utilization of or eliminating altogether the need for current, as well as future, energy supply facilities.

The impact on the State's carbon footprint is far greater than any other State policy proposal of which we are aware.



Prepared for the Delaware Sustainable Energy Utility Task Force by the Center for Energy & Environmental Policy.

The Delaware Sustainable Energy Utility: Our Best Environmental Policy